

## PATENT ABSTRACTS OF JAPAN

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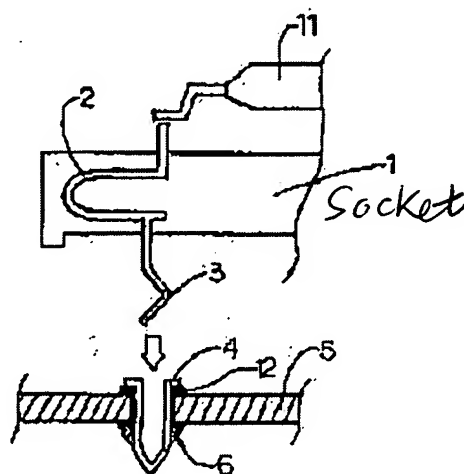
(72)Inventor : MATSUMURA SHIGERU

## (54) CONNECTING PIN OF IC SOCKET

## (57)Abstract:

PURPOSE: To provide the small-sized and inexpensive form of a connecting pin for IC connector capable of high density connection which is used in the device interface part of an IC tester.

CONSTITUTION: In the working form of the connecting pin 2 of an IC socket 1, one or a plurality of bent parts 3 are provided on the connecting pin 2 which is inserted to the pin connector 4 of the device interface part of an IC tester to make an electric connection, and a form enhanced in spring property is provided. The connecting pin 2 may be provided with a slit, a spring rolled into funnel form, or a plurality of bent parts having different directions.



## LEGAL STATUS

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CLAIMS

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[Claim(s)]

[Claim 1] The contact pin of the IC socket characterized by preparing one piece or two or more flections (3) in the contact pin (2) which inserts in the pin connector (4) which constitutes the device interface section of IC circuit tester in the processing configuration of the contact pin (2) of an IC socket (1), and performs electrical installation.

[Claim 2] The contact pin of the IC socket according to claim 1 which prepared the slit (7) in the contact pin (2) which inserts in a pin connector (4) and performs electrical installation.

[Claim 3] The contact pin of the IC socket according to claim 1 which prepared the spring (8) rounded off in the shape of a funnel to the contact pin (2) which inserts in a pin connector (4) and performs electrical installation.

[Claim 4] The contact pin of the IC socket according to claim 1 which prepared two or more flections (9) of a wrong direction in the contact pin (2) which inserts in a pin connector (4) and performs electrical installation.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the configuration of the contact pin of the IC socket used for the device interface section of IC circuit tester.

[0002]

[Description of the Prior Art] The configuration of the contact pin of an IC socket had become the configuration of having determined the structure of the device interface section of IC circuit tester, and corresponding as what was given by the manufacturer of an IC socket.

[0003] (1) The mounting tooth space which the device interface section needs for the reason was not able to be made into the smaller tooth space.

(2) That is, while it has been the contact pin of the conventional IC socket with the straight configuration of the contact pin, usually it is used as the prerequisite which was able to give it, or a thing which cannot be changed.

[0004] (3) However, by the densification of the sense terminal accompanying IC device which serves as a measuring object-ed object recently having been integrated by high density, the terminal pitch is becoming small gradually and, moreover, the whole IC device concerned is enlarged.

(4) On the other hand, in order to raise measurement effectiveness as an IC circuit tester, as many IC devices as possible have been arranged to the tooth space to which the device interface section was restricted in the test section of IC circuit tester, and implementation of the structure of mounting the IC socket which makes coincidence measurement possible was approached.

[0005] As [ showed / in drawing 5 and drawing 6 / (5) and the structure where time mounted the IC socket in the device interface section of IC circuit tester on the assumption that the contact pin of the IC socket of the conventional technique ] It is considering as the structure which maintains airtightness so that the case of both sides may not make circulation of air cause in the vertical direction side of a printed-circuit board 5.

[0006] (6) For this reason, it has the structure of performing electrical installation of the IC device 11 and the device interface section, by carrying out the pin connector 4 which made the contact pin 2 the through hole 12 established in the printed-circuit board 5 direct soldering 6 like [ in the case of the example of drawing 5 ], or pressed the inner contact 13 fit in the through hole 12 inside first like drawing 6 soldering 6, next inserting a contact pin 2 in that inner contact 13.

[0007] (7) Therefore, as illustrated to drawing 5 , even when \*\* IC socket 1 becomes with a life in a configuration of making the direct continuation pin 2 into the through hole 12 of a printed-circuit board 5 soldering 6, it cannot exchange easily. \*\* The activity man day for taking soldering 6 again will cut in many.

[0008] (8) And although it is comparatively easy to carry out a pin connector 4 and the lower part part of a through hole 12 soldering 6 when using a pin connector 4 and the inner contact 13 as shown in drawing 6 , only the part which needs the \*\* pin connector 4 and the inner contact 13 as a component part serves as KOSUTOAPPU. \*\* Further, since it was the structure of the device interface section

which must be constituted from a pin connector 4 and inner contact 13, it had the trouble that there was a limitation in realizing the physical more small pitch between terminals.

[0009]

[The technical problem which is going to solve invention] The technical problem which this invention should solve is made into the structure where it can respond to carrying out (A) densification, large-scale-izing, and the pitch between the sense terminals of a measuring object-ed IC device becoming small, in the device interface section of the test section of IC circuit tester.

(B) in addition -- and it is being able to realize by low cost more and acquiring the configuration of the contact pin of the IC socket which can respond to the small pitch between sense terminals which high-density and large-scale IC device's needs in the device interface section moreover, without carrying out a cost rise by that.

[0010]

[Means for Solving the Problem] In order [ above-mentioned ] to carry out the purpose achievement, it sets to this invention. The configuration of the contact pin of (1) IC socket For the side which constitutes the electronic measurement device system which measures the electrical characteristics of IC device using IC circuit tester, it shall give up as given conditions which are hard to move, and shall not change. By having deformed the configuration of the contact pin of the IC socket, and having given spring nature, even if there was no inner contact etc., it considered as the configuration from which a more positive contact property with a pin connector is acquired.

[0011] (2) Moreover, taking advantage of the property of a pin connector, airtightness shall be maintained by having considered as the configuration of the contact pin of this invention.

[0012]

[Function] With it being easy to process it into, since it is a simple configuration, and a pin connector being low cost and being able to process the thing of the configuration of moreover more a narrow diameter, from the first the quality of the material of a contact pin Generally as a component, for example, in order to use a thing with spring nature, such as phosphor bronze, That the contact pin which has spring nature more by the spring quality of the material being efficiently employed even if it processes it into the thing of the configuration of a contact pin like this invention was obtained conjointly With the conventional technique, the required inner contact became unnecessary and the structure of the higher-density device interface section was acquired more by low cost.

[0013]

[Example] Drawing 1 is the sectional view showing the concept of the configuration of the contact pin 2 of IC socket 1 of the example by this invention. That is, it is the sectional view showing the concept of the configuration of the device interface section which the contact pin 2 of IC socket 1 of this invention is inserted, and performs electrical installation. Moreover, drawing 2<sup>1</sup>, and 3 and 4 are the conceptual diagrams showing the configuration of the contact pin 2 of IC socket 1 of other examples by this invention.

[0014] (1) The configuration of the contact pin 2 of IC socket 1 of this invention was made crooked so that the part inserted in a pin connector 4 can improve electrical installation with a pin connector 4 more as shown in drawing 1 . The above-mentioned contact pin 2 which consists of ingredients which usually have spring nature by that is pushed by the pressure strong against the wall, in case spring nature is strengthened further and inserted in a pin connector 4.

[0015] (2) Since it became unnecessary to form the inner contact 13 in a pin connector 4 like [ in the case of being based on the conventional technique ] by having considered as the structure constituted from a configuration of the contact pin 2 of IC socket 1 of this invention and a pin connector 4 of the device interface section, the bore and appearance of the part pin connector 4 were able to be made small.

[0016] (3) It is the example of the configuration of the contact pin 2 of the IC connector 1 in other examples of this invention which was shown in drawing 2 . Furthermore, drawing 3 and 4 are each example of the configuration of the contact pin 2 of the IC connector 1 of other examples similarly.

[0017] (4) It is common to have consider as the configuration which replaces with carry out by carry out

soldering 6 or form inner contact 13, and gives more spring nature in short at contact pin 2 the very thing although the through hole 12 or pin connector 4 of the device interface section in the contact pin 2 of the IC connector 1 and IC circuit tester test section is connect electrically like the conventional technique so that clearly [ in each example ] in addition .

[0018] (5) Moreover, the gestalt of the material which has spring nature may be monotonous, or the round bar is sufficient as it, and it is not restrained. Therefore, the flection 3 inevitably shown in drawing 1 is good also as a configuration where made the part of a contact pin 2 into plurality as more than one may be formed and it was shown in drawing 4 R> 4, and the flection 9 of a wrong direction was further given to each. and the slit 7 shown in drawing 2 -- two or more piece predetermined number \*\*\*\*\* -- things are also good, and even if it forms two or more springs 8 which rounded off the part inserted in the connector 4 of a contact pin 2 as further shown in drawing 3 in the shape of a funnel, the direction to round off is not asked, either.

[0019]

[Effect of the Invention] Since this invention is constituted as explained above, it does so effectiveness which is indicated below.

(1) since it be more small and the device interface section be constituted in high density with constitute from a configuration of the contact pin of the IC socket of this invention, and a configuration of a pin connector without also reduce the dependability of electrical installation, maintain the airtightness of the vertical direction side of the device interface section of IC circuit tester originally need, high density be accumulated, and it became possible to correspond to measurement of the electrical characteristics of the measuring object-ed IC device used as the small pitch between terminals efficiently.

[0020] (2) Moreover, since the property of the ingredient which forms the contact pin of an IC socket was what originally has spring nature, it is easy to process the configuration of the contact pin for raising spring nature further like this invention, and the increment in the cost of materials was also able to be realized by low cost few.

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PRIOR ART

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[Description of the Prior Art] The configuration of the contact pin of an IC socket had become the configuration of having determined the structure of the device interface section of IC circuit tester, and corresponding as what was given by the manufacturer of an IC socket.

[0003] (1) The mounting tooth space which the device interface section needs for the reason was not able to be made into the smaller tooth space.

(2) That is, while it has been the contact pin of the conventional IC socket with the straight configuration of the contact pin, usually it is used as the prerequisite which was able to give it, or a thing which cannot be changed.

[0004] (3) However, by the densification of the sense terminal accompanying IC device which serves as a measuring object-ed object recently having been integrated by high density, the terminal pitch is becoming small gradually and, moreover, the whole IC device concerned is enlarged.

(4) On the other hand, in order to raise measurement effectiveness as an IC circuit tester, as many IC devices as possible have been arranged to the tooth space to which the device interface section was restricted in the test section of IC circuit tester, and implementation of the structure of mounting the IC socket which makes coincidence measurement possible was approached.

[0005] As [ showed / in drawing 5 and drawing 6 / (5) and the structure where time mounted the IC socket in the device interface section of IC circuit tester on the assumption that the contact pin of the IC socket of the conventional technique ] It is considering as the structure which maintains airtightness so that the case of both sides may not make circulation of air cause in the vertical direction side of a printed-circuit board 5.

[0006] (6) For this reason, it has the structure of performing electrical installation of the IC device 11 and the device interface section, by carrying out the pin connector 4 which made the contact pin 2 the through hole 12 established in the printed-circuit board 5 direct soldering 6 like [ in the case of the example of drawing 5 ], or pressed the inner contact 13 fit in the through hole 12 inside first like drawing 6 soldering 6, next inserting a contact pin 2 in that inner contact 13.

[0007] (7) Therefore, as illustrated to drawing 5 , even when \*\* IC socket 1 becomes with a life in a configuration of making the direct continuation pin 2 into the through hole 12 of a printed-circuit board 5 soldering 6, it cannot exchange easily. \*\* The activity man day for taking soldering 6 again will cut in many.

[0008] (8) And although it is comparatively easy to carry out a pin connector 4 and the lower part part of a through hole 12 soldering 6 when using a pin connector 4 and the inner contact 13 as shown in drawing 6 , only the part which needs the \*\* pin connector 4 and the inner contact 13 as a component part serves as KOSUTOAPPU. \*\* Further, since it was the structure of the device interface section which must be constituted from a pin connector 4 and inner contact 13, it had the trouble that there was a limitation in realizing the physical more small pitch between terminals.

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EFFECT OF THE INVENTION

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[Effect of the Invention] Since this invention is constituted as explained above, it does so effectiveness which is indicated below.

(1) since it be more small and the device interface section be constituted in high density with constitute from a configuration of the contact pin of the IC socket of this invention, and a configuration of a pin connector without also reduce the dependability of electrical installation, maintain the airtightness of the vertical direction side of the device interface section of IC circuit tester originally need, high density be accumulated, and it became possible to correspond to measurement of the electrical characteristics of the measuring object-ed IC device used as the small pitch between terminals efficiently.

[0020] (2) Moreover, since the property of the ingredient which forms the contact pin of an IC socket was what originally has spring nature, it is easy to process the configuration of the contact pin for raising spring nature further like this invention, and the increment in the cost of materials was also able to be realized by low cost few.

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TECHNICAL PROBLEM

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[The technical problem which is going to solve invention] The technical problem which this invention should solve is made into the structure where it can respond to carrying out (A) densification, large-scale-izing, and the pitch between the sense terminals of a measuring object-ed IC device becoming small, in the device interface section of the test section of IC circuit tester.  
(B) in addition -- and it is being able to realize by low cost more and acquiring the configuration of the contact pin of the IC socket which can respond to the small pitch between sense terminals which high-density and large-scale IC device's needs in the device interface section moreover, without carrying out a cost rise by that.

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MEANS

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[Means for Solving the Problem] In order [ above-mentioned ] to carry out the purpose achievement, it sets to this invention. The configuration of the contact pin of (1) IC socket For the side which constitutes the electronic measurement device system which measures the electrical characteristics of IC device . . using IC circuit tester, it shall give up as given conditions which are hard to move, and shall not change. By having deformed the configuration of the contact pin of the IC socket, and having given spring nature, even if there was no inner contact etc., it considered as the configuration from which a more positive contact property with a pin connector is acquired.

[0011] (2) Moreover, taking advantage of the property of a pin connector, airtightness shall be maintained by having considered as the configuration of the contact pin of this invention.

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OPERATION

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[Function] With it being easy to process it into, since it is a simple configuration, and a pin connector being low cost and being able to process the thing of the configuration of moreover more a narrow diameter, from the first the quality of the material of a contact pin Generally as a component, for example, in order to use a thing with spring nature, such as phosphor bronze, That the contact pin which has spring nature more by the spring quality of the material being efficiently employed even if it processes it into the thing of the configuration of a contact pin like this invention was obtained conjointly With the conventional technique, the required inner contact became unnecessary and the structure of the higher-density device interface section was acquired more by low cost.

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EXAMPLE

[Example] Drawing 1 is the sectional view showing the concept of the configuration of the contact pin 2 of IC socket 1 of the example by this invention. That is, it is the sectional view showing the concept of the configuration of the device interface section which the contact pin 2 of IC socket 1 of this invention is inserted, and performs electrical installation. Moreover, drawing 2, and 3 and 4 are the conceptual diagrams showing the configuration of the contact pin 2 of IC socket 1 of other examples by this invention.

[0014] (1) The configuration of the contact pin 2 of IC socket 1 of this invention was made crooked so that the part inserted in a pin connector 4 can improve electrical installation with a pin connector 4 more as shown in drawing 1. The above-mentioned contact pin 2 which consists of ingredients which usually have spring nature by that is pushed by the pressure strong against the wall, in case spring nature is strengthened further and inserted in a pin connector 4.

[0015] (2) Since it became unnecessary to form the inner contact 13 in a pin connector 4 like [ in the case of being based on the conventional technique ] by having considered as the structure constituted from a configuration of the contact pin 2 of IC socket 1 of this invention and a pin connector 4 of the device interface section, the bore and appearance of the part pin connector 4 were able to be made small.

[0016] (3) It is the example of the configuration of the contact pin 2 of the IC connector 1 in other examples of this invention which was shown in drawing 2. Furthermore, drawing 3 and 4 are each example of the configuration of the contact pin 2 of the IC connector 1 of other examples similarly.

[0017] (4) It is common to have consider as the configuration which replaces with carry out by carry out soldering 6 or form inner contact 13, and gives more spring nature in short at contact pin 2 the very thing although the through hole 12 or pin connector 4 of the device interface section in the contact pin 2 of the IC connector 1 and IC circuit tester test section is connect electrically like the conventional technique so that clearly [ in each example ] in addition.

[0018] (5) Moreover, the gestalt of the material which has spring nature may be monotonous, or the round bar is sufficient as it, and it is not restrained. Therefore, the flecion 3 inevitably shown in drawing 1 is good also as a configuration where made the part of a contact pin 2 into plurality as more than one may be formed and it was shown in drawing 4 R> 4, and the flecion 9 of a wrong direction was further given to each. and the slit 7 shown in drawing 2 -- two or more piece predetermined number \*\*\*\*\* -- things are also good, and even if it forms two or more springs 8 which rounded off the part inserted in the connector 4 of a contact pin 2 as further shown in drawing 3 in the shape of a funnel, the direction to round off is not asked, either.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the sectional view showing the concept of the contact pin configuration of the IC socket of an example, and the structure of the device interface section by this invention.

[Drawing 2] It is the conceptual diagram showing the contact pin configuration of the IC socket of other examples of this invention.

[Drawing 3] It is the conceptual diagram showing the contact pin configuration of the IC socket of the third example of this invention.

[Drawing 4] It is the conceptual diagram showing the contact pin configuration of the IC socket of the fourth example of this invention.

[Drawing 5] It is the sectional view showing the concept of the contact pin configuration of an IC socket, and the structure of the device interface section by the conventional technique.

[Drawing 6] It is the sectional view showing the concept of the contact pin configuration of the IC socket of other examples, and the structure of the device interface section by the conventional technique.

[Description of Notations]

- 1 IC Socket
- 2 Contact Pin
- 3 Flection
- 4 Pin Connector
- 5 Printed-circuit Board
- 6 Soldering
- 7 Slit
- 8 Spring Rounded Off in the shape of a Funnel
- 9 Flection of Selfish Difference
- 11 IC Device
- 12 Through Hole
- 13 Inner Contact

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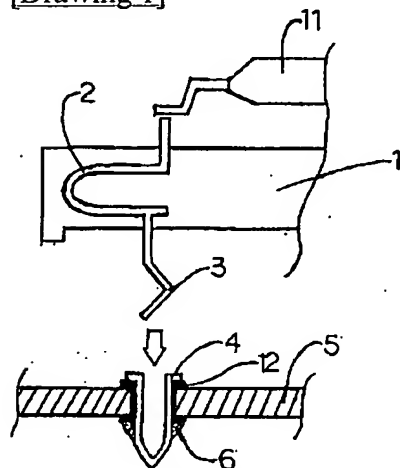
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DRAWINGS

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[Drawing 1]



[Drawing 2]



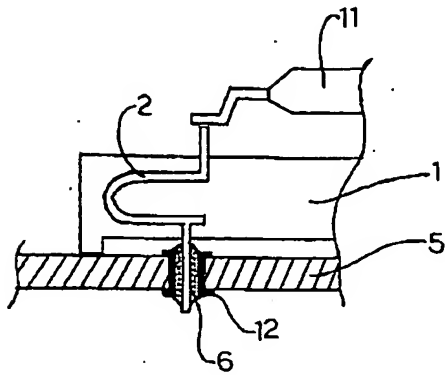
[Drawing 3]



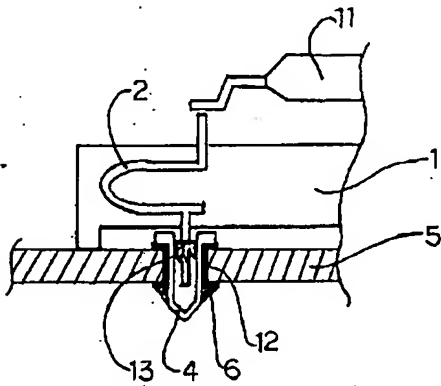
[Drawing 4]



[Drawing 5]



[Drawing 6]



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